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BOTANY.<sup>1</sup>

**Ellis and Everhart's North American Fungi.**—Subscribers to this set have recently received Century XXX of this great distribution of specimens, bringing the number up to 3000. Messrs. Ellis and Everhart are to be congratulated upon having carried their work to this point without a break or serious delay; an achievement never before excelled. May we not hope that they will push forward now toward the fortieth century?

The present volume is a miscellaneous one, including representatives of genera in widely separated families. Thus, there are of *Æcidium* 4 species, *Capnodium* 3, *Cercospora* 11, *Cladosporium* 2, *Cylindrosporium* 3, *Gymnosporangium* 2, *Morchella* 1, *Peronospora* 1, *Peziza* 4, *Phyllosticta* 4, *Puccinia* 7, *Septoria* 6, *Uromyces* 2, besides many others of equally wide relationship.

Of the quality of the specimens nothing need be said. The preceding Centuries have shown that in this regard nothing is wanting. Botanists who are so unfortunate as not to have secured a set of the North American Fungi, will be glad to know that the authors have begun a new set under the name of "Fungi Columbiani," of which they now offer Centuries I and II at six dollars each.—CHARLES E. BESSEY.

**A Synopsis of the larger Groups of the Vegetable Kingdom.**—The following synopsis represents the results of a careful review of the larger groups of the vegetable kingdom. The Classes are, with few exceptions, those usually recognized by modern authors, but in the first and second their limits have been slightly extended so as to include a comparatively small number of degraded chlorophyll-less forms, the Bacteria and the Phycomycetous fungi.

In like manner, in a few cases, slight changes have been made in the limits of the groups below classes (here tentatively called orders), otherwise they remain essentially as usually outlined. In the attempt to co-ordinate groups it becomes obvious that the "Orders" of the lower plants are equivalent to the "series" of the Angiosperms, according to the nomenclature of Bentham and Hooker's *Genera Plantarum*. At first sight it may seem to be a violent innovation to transfer the term "Order" from *Rosaceæ*, for example, to the great aggregate of forms, the *Calycifloræ*, yet a careful study

<sup>1</sup>Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.

of the whole system of plants warrants the assertion that these Benthamian "series" are entitled to no higher rank. The so-called "orders" of the manuals are, in fact, no more than families, and these in the flowering plants have become greatly multiplied.

The apetalous families of Dicotyledons are not regarded as constituting a separate group, but are distributed among the Choripetalæ and Gamopetalæ. In both Monocotyledons and Dicotyledons the apocarpous families are regarded as primitive and lower, and the syncarpous as higher; and among the latter the epigynous are regarded as higher than the hypogynous.

## SYNOPSIS.

### Branch I. PROTOPHYTA (Protophytes; Water-Slimes).

Single cells, or chains of cells, reproducing by fission and endospores.

- Class 1. SCHIZOPHYCEÆ. { Order Cystiphoræ (Blue-green Slimes).  
(Fission Algæ.) { Order Nematogeneæ (Nostocs, Bacteria, etc.).

### Branch II. PHYCOPHYTA (Phycophytes; Spore-Tangles).

Single cells, chains, or masses, the latter sometimes forming a branching plant with rhizoids. Sexual reproduction by the union of two protoplasts to form a single resting-spore (zygospore or oöspore).

- Class 2. CHLOROPHYCEÆ. { Order Protococceidæ (Green-Slimes, Synchronia, etc.).  
(Green Algæ.) { Order Conjugatæ (Pond-Scums, Black Moulds, etc.).  
                                  { Order Siphoniæ (Green-Felts, Downy Mildews, etc.).  
                                  { Order Confervoideæ (Water-Flannels; etc.).

- Class 3. PHAROPHYCEÆ. { Order Phaeosporæ (Kelps).  
(Brown Algæ.) { Order Dictyotæ.  
                                  { Order Fucoideæ (Rockweeds).

### Branch III. CARPOPHYTA (Carpophytes; Fruit-Tangles).

Chains, plates or masses of cells, the latter often forming a branching plant with rhizoids. Sexual reproduction (where known) by the union of two protoplasts to form a spore-fruit (sporocarp).

- Class 4. COLEOCHAETÆÆ. { Order Coleochaetaceæ (Simple Fruit-Tangles).

- Class 5. ASCOMYCETES. { Order Perisporiaceæ (Simple Sac-Fungi).  
(Sac-Fungi.) { Order Tuberoideæ (Subterranean Sac-Fungi).  
                                  { Order Pyrenomycetææ (Black Fungi, including lichens).  
                                  { Order Discomycetææ (Cup Fungi, including lichens).  
                                  { Order Uredineæ (Rusts).  
                                  { Order Ustilagineæ (Smuts).  
                                  { Order Sphaeropsidæ.  
"Imperfect Fungi." { Order Melanconiceæ.  
                                  { Order Hyphomycetææ.

- Class 6. BASIDIOMYCETES. { Order Gasteromycetææ (Puff-balls, etc.).  
(Higher Fungi) { Order Hymenomycetææ (Toadstools, etc.).

- Class 7. RHODOPHYCEÆ. { Order Florideæ (Red Seaweeds).

- Class 8. CHAROPHYCEÆ. { Order Characeæ (Stoneworts).

## Branch IV. BRYOPHYTA (Bryophytes ; Mossworts).

Masses of cells, forming a flat, branching plant with rhizoids, or a leafy stem (oöphyte), reproducing by the union of two protoplasts and the formation of a leafless, spore-bearing stem (sporophyte).

Class 9. HEPATICAE. { Order Marchantiaceae (Liverworts, proper).  
(Liverworts.) { Order Jungermanniaceae (Scale-mosses).  
Order Anthocerotaceae (Horned Liverworts).

Class 10. MUSCI. { Order Andreaeaceae.  
(Mosses.) { Order Sphagnaceae (Peat Mosses).  
Order Archidiaceae  
Order Bryaceae (True Mosses).

## Branch V. PTERIDOPHYTA (Pteridophytes ; Fernworts).

Masses of cells, forming a flat plant, usually with rhizoids (oöphyte), reproducing by the union of two protoplasts and the formation of a stem with roots and spore-bearing leaves (sporophyte).

Class 11. FILICINAE. { Order Ophioglossaceae (Adder-Tongues).  
(Ferns.) { Order Marattiaceae (Ringless Ferns).  
Order Filices (True Ferns).  
Order Hydropteridaceae (Pepperworts).

Class 12. EQUISETINEA. { Order Equisetaceae (Joint-rushes ; Horsetails).

Class 13. LYCOPODINAE. { Order Lycopodiaceae (Club-mosses).  
(Lycopods.) { Order Selaginellaceae (Little Club-mosses).  
Order Isoetaceae (Quillworts).

## Branch VI. ANTHOPHYTA (Anthophytes ; Flowering Plants).

Oöphyte small, few-celled, enclosed in the tissue of the sporophyte ; reproducing by the union of two protoplasts and the formation of a sporophyte consisting of a stem with roots and spore-bearing leaves, the latter constituting the "flower."

Class 14. GYMNOSPERMAE. { Order Cycadeae (Cycads).  
(Gymnosperms.) { Order Coniterae (Conifers).  
Order Gnetaceae (Joint-Firs).

Class 15. ANGIOSPERMAE. (Angiosperms.)	{	Sub-Cl. I. <i>Monocotyledones</i> . (Monocotyledons.)	{ Order Apocarpae (Water Plantains).
			{ Order Coronarieae (Lilies).
			{ Order Nudiflorae (Aroids).
			{ Order Calycinae (Palms).
			{ Order Glumaceae (Grasses and Sedges)
			{ Order Hydrales (Waterworts).
			{ Order Epigynae (Irids).
			{ Order Microspermae (Orchids).
	{	Sub-Cl. II. <i>Dictyledones</i> . (Dicotyledons.)	{ Order Thalamiflorae (Toral Choripetalae ; Torals).
{ Order Disciflorae (Discal Choripetalae ; Discals).			
{ Order Calyciflorae (Calycal Choripetalae ; Calycals).			
{ Order Heteromerae (Heteromerale Gamopetalae ; Heteromerals).			
		ii. Gamopetalae.	{ Order Bicarpetalae (Bicarpal Gamopetalae ; Bicarps).
	{ Order Inferae (Inferal Gamopetalae ; Inferals).		

In the foregoing, the slime moulds (*Mycetozoa*) have been omitted, as there can be but little doubt that they more properly belong to the animal kingdom.—CHARLES E. BESSEY.